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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL A. WASSERMAN, EWA M. KUBALSKA,
NATHANIEL DAVID NAEGLE, BRIAN D. EMBERLING,
PAUL R. RAMSEY, and MARK E. PASCUAL

Appeal 2009-003129
Application 10/673,088
Technology Center 2600

Decided: November 30, 2009

Before MAHSHID D. SAADAT, JOHN A. JEFFERY, and
MARC S. HOFF, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-14, 18, 19, and 21-25. Claims 15-17 and 20 have been

indicated as containing allowable subject matter. Ans. 6.[1] We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellants invented a system and method for distributing digital video data. The system includes rendering units (e.g., 350A-D) and convolve units (e.g., 650A-D) receiving video pixel data from the rendering units. Partial convolutions are summed to output a new accumulated convolution.[2]

Independent claim 1 is reproduced below with the key disputed limitations emphasized:

> 1. A system for distributed convolution of stacked digital video data comprising:
>
> a plurality of video data convolve units connected in a chain, wherein a video data convolve unit is *operable to*:
>
> *receive video pixel data from a video output of a dedicated rendering unit*;
>
> calculate partial convolution sums for a set of the video pixels that are located within a convolution kernel;
>
> receive accumulated partial convolution sums from a prior video data convolve unit in the chain, unless the video data convolve unit is the first video data convolve unit in the chain;
>
> add the calculated partial convolution sums to the previously accumulated partial convolution sums; and

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[1] Throughout this opinion, we refer to the Appeal Brief filed August 29, 2007 and the Examiner's Answer mailed November 23, 2007.
[2] *See generally* Spec. 27-34; Figs. 16-18.

output new accumulated partial convolution sums to the next video data convolve unit in the chain, unless the video data convolve unit is the last video data convolve unit in the chain.

The Examiner relies on the following as evidence of unpatentability:

Rousseau	US 5,524,075	June 4, 1996
Deering	US 6,417,861 B1	July 9, 2002

The Examiner rejected claims 1-14, 18, 19, and 21-25 under 35 U.S.C. § 103(a) as unpatentable over Rousseau and Deering. Ans. 3-5.

Appellants group the claims as follows: (1) claims 1-9; (2) claims 10-13; and (3) claims 14, 18, 19, and 21-25.[3] Br. 5-9. Each grouping will be addressed separately.

Claims 1-9

Regarding representative independent claim 1,[4] the Examiner finds Rousseau discloses all the limitations except for the video data convolve unit receiving video pixel data from a video output of a dedicated rendering unit. Ans. 3. The Examiner relies on Deering to teach a convolve unit that receives pixel data from rendering units to provide real-time filter processing and better flexibility. Ans. 3-4.

[3] Appellants include claims 15-17 and 20 in this group. Br. 8-9. These claims, however, have been indicated as containing allowable subject matter. Ans. 6.

[4] Appellants argue claims 1-9 together as a group. *See* Br. 5-6. Accordingly, we select independent claim 1 as representative. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Appellants argue that Deering does not teach: (1) receiving pixel data from rendering units or (2) receiving pixel data from a video output. Br. 5-6. Appellants also contend that neither Rousseau nor Deering, alone or in combination, teach receiving pixel data from a video output of a dedicated rendering unit. Br. 6.

The issue before us, then, is as follows:

ISSUE

Under § 103, have Appellants shown that the Examiner erred in rejecting claim 1 by finding that Rousseau and Deering collectively teach or suggest "a video data convolve unit is operable to: receive video pixel data from a video output of a dedicated rendering unit"?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence:

Rousseau

1. Rousseau discloses a system 20 for processing digital images (e.g., photographs) that includes a control processor 21, a video RAM controller (VRAMC) 22, a video RAM (VRAM) 23, and digital processing circuit 30. Col. 1, ll. 9-17 and 57-60 and col. 7, ll. 54-59; Fig. 2B.

2. Within processing circuit 30, cross bar unit (CRX) 31: (a) transfers RAM images ($I_{m0\text{-}3}$) stored in RAM 32 to convolution ("CONVOL") unit 34, and (b) reads and writes communication between VRAM 23 and Image Storage RAM 32 for transmittal to convolution unit 34. Col. 1, ll. 57-60 and col. 9, l. 44 – col. 10, l. 27; Figs. 2B and 4.

3. Rousseau discloses an address generator 33 that extracts pixels from images ($I_{m0\text{-}3}$) and writes a resulting pixel series to VRAM 23 from RAM32 through CRX 31. Address generator 33 and VRAMC 22 control the direction, the reading, and the writing of signals. Col. 10, ll. 53-64 and col. 11, ll. 17-25 and 34-47; Figs. 2B and 5.

4. Rousseau's convolution unit 34 includes MAC circuits 3416 that receive the VRAM's information through CRX 31 and perform various convolution summing. Col. 10, ll. 29-44 and col. 14, l. 13-col. 17, l. 51; Fig. 6C, H, and J.

Deering

5. Deering discloses a graphics system 112 that includes four rendering units 150A-D, a schedule unit 154, four sample memories 160A-N, and four sample-to-pixel calculation units 170A-D. Col. 9, l. 38-55; Fig. 3.

6. Deering's control unit 140 divides the data stream into four parallel streams that are routed to individual rendering units 150A-D. Col. 9, ll. 60-65; Fig. 3.

7. Deering's rendering units 150A-D calculate "samples" instead of actual pixel data. Deering explains that the sample number stored may be greater than, equal to, or less than the number of pixels outputted to the display device. Col. 11, ll. 18-25 and 59-62.

8. Some samples in Deering "correspond" to an output pixel when the information contributes to the final output value of the pixel, and may also have a position that corresponds to display locations. Col. 11, ll. 18-25 and 62-65 and col. 12, ll. 1-4.

9. Deering's schedule unit 154 is coupled between the rendering units 150A-D and sample memories 160A-N, sequences the completed samples, and stores the samples in memories 160A-N. Col. 11, ll. 45-51; Fig. 3.

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073-74 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (stating that 35 U.S.C. § 103 leads to three basic factual inquiries: the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the art). "[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

ANALYSIS

Based on the record before us, we find no error in the Examiner's obviousness rejection of representative claim 1. At the outset, we note that claim 1 recites a system and not a method. Thus, the recitation of "a video data convolve unit is operable to: receive video pixel data from a video output of a dedicated rendering unit" is a functional limitation. Therefore, to meet this limitation, the prior art's structure (i.e., the combined Rousseau/Deering convolve unit) must be capable of performing this

function, namely receiving video pixel data from a video output of a dedicated rendering unit. *See In re Schreiber*, 128 F.3d 1473, 1477-78 (Fed. Cir. 1997).

Rousseau discloses a system 20 for processing digital images that includes cross bar unit (CRX) 31 that receives images ($I_{m0\text{-}3}$) and sends the images to convolution or convolve unit 34. FF 1-2. In particular, the CRX 31 reads and writes communication (e.g., images) between VRAM 23 and Image Storage RAM 32 for transmittal to convolution unit 34. FF 2. The address generator 33 extracts pixels from the images to generate a resulting pixel series that is sent to VRAM 23 through CRX 31. *See* FF 3. The convolution unit 34 and its MAC circuits 3416 then receive the VRAM 23 information through CRX 31 and perform various convolution summing. FF 4. Thus, Rousseau discloses and teaches a convolve unit 34 that receives pixel data from a video output (e.g., VRAM 23) through CRX 31.

We agree with Appellants (Br. 5) that Rousseau does not explicitly disclose the pixel data is video pixel data. *See* FF 1. Nonetheless, Rousseau discloses a *video* RAM controller (VRMAC) 22 and *video* RAM (VRAM) 23, both of which inherently possess the ability to output video data. *See* FF 1-3. Additionally, because Rousseau's convolve unit 34 receives pixel data (*see* FF 3-4) from CRX 31 and the VRAM 23 is capable of outputting video data, we find that the convolve unit 34 and MAC circuits 3416 are inherently capable of receiving video pixel data. Furthermore, Appellants have provided insufficient evidence to demonstrate that Rousseau's system could not receive such video pixel data, and we find no reason why this system and its circuitry would prevent the convolve unit 34 from receiving

video pixel data. Thus, contrary to Appellants' assertions (Br. 5), Rousseau's convolve unit is operable to receive video pixel data from a video output as recited in claim 1.

Moreover, Deering teaches the concept of sending video pixel data from a video output of a rendering unit as recited in claim 1. Deering teaches and shows a graphics system 112 that includes four rendering units 150A-D, four sample memories 160A-N, and four sample-to-pixel calculation units 170A-D. FF 5. Deering describes and shows that the control unit 140 divides the data stream into four parallel stream that are routed to individual rendering units 150A-D. FF 6. To be sure, samples are calculated within the rendering units 150A-D that may not be actual pixel data. FF 7. Nonetheless, Appellants have not defined "pixel data" (*see generally* Specification), and the samples can correspond to output pixels on the display or equal the number of pixels. FF 8. Thus, giving the phrase, "pixel data" in claim 1 its broadest reasonable interpretation in light of the Specification, the "samples" that are equal to the number of pixels or correspond to the output pixels relate to pixel information and are therefore video pixel data. *See In re Am. Acad. Of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

Appellants argue that neither Rousseau nor Deering discloses that the video output to each convolve unit is from a *dedicated* rendering unit. Br. 6. Particularly, Appellants point to the schedule unit 154 intermediate to the rendering units 150A-D and the calculation or convolve units 170A-D to demonstrate that each rendering unit is not dedicated to a convolve unit. *See* FF 5. While we disagree with the Examiner's position that Rousseau's control processor 21 reads on a rendering unit (Ans. 5), we are nevertheless

not persuaded that the combined Rousseau/Deering system does not teach or suggest a convolve unit capable of receiving (or actually receives) video pixel data from a dedicated rendering unit.

As discussed above, Deering discloses four rendering units 150A-D and, likewise, four convolution units 170A-D. *See* FF 5. Because the number of rendering units and convolution units are the same, Deering at least suggests that there can be a correspondence between a rendering unit and a convolution unit (e.g., rendering unit 150A and convolution unit 170A). Moreover, using the background knowledge of a skilled artisan, an ordinarily skilled artisan would have recognized a one-to-one type correspondence between a rendering unit and a convolution unit (e.g., 150A and 170A) would process the inputted data in methodical and organized fashion. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).

For example, the schedule unit 154 samples the data exiting the rendering unit 150A first (*see* FF 9), and then directs this data to sample memory 160A and convolve unit 170A. Schedule unit 154 next samples rendering unit 150B and directs this data to sample memory 160B and convolve unit 170B. Thus, while schedule unit 154 lies intermediate to the rendering units and convolve units, we find that Deering suggests a technique for matching a rendering unit to a convolution unit so that the combined Rousseau/Deering system has convolve units that receive video pixel data from dedicated rendering units as claim 1 requires.

For the foregoing reasons, Appellants have not shown error in the obviousness rejection of claims 1-9 based on the combination of Rousseau and Deering.

Claims 10-13

Representative independent claim 10[5] recites a similar system to claim 1, including convolve units and each convolve unit is operable to "receive video pixel data from a video output of a dedicated rendering unit." The Examiner presented the same rejection for claims 1 and 10. *See* Ans. 5. Appellants present identical arguments for claim 10 as were presented for claim 1. See Br. 6-8. The issue for claim 10 is therefore the same as that with respect to claim 1. For the reasons stated above, Appellants have not shown error in the obviousness rejection of claims 10-13 based on the combination of Rousseau and Deering.

Claims 14, 18, 19, and 21-25

Representative independent claim 14[6] recites a method that includes the step of receiving video pixel data from a video output of a dedicated rendering unit. The Examiner relies on the same discussion presented regarding claim 1 to reject claim 14. *See* Ans. 5. Appellants present identical arguments for claim 14 as was presented for claim 1. *See* Br. 8-9.

The issue before us, then, is as follows:

[5] Appellants argue claims 10-13 together as a group. *See* Br. 6-8. Accordingly, we select claim 10 as representative. *See* 37 C.F.R. § 41.37(c)(1)(vii).

[6] Appellants argue claims 14, 18, 19, and 21-25 together as a group. *See* Br. 8-9. Accordingly, we select independent claim 14 as representative. *See* 37 C.F.R. § 41.37(c)(1)(vii).

ISSUE

Under § 103, have Appellants shown that the Examiner erred in rejecting claim 14 by finding that Rousseau and Deering collectively teach or suggest the step of each video data convolve unit "receiving video pixel data from a video output of a dedicated rendering unit"?

ANALYSIS

Based on the record before us, we find no error in the Examiner's obviousness rejection of representative claim 14. Contrary to claim 1, claim 14 recites the *active* step of receiving video pixel data from a video output. Nonetheless, much of the discussion of claim 1 is applicable to claim 14. We therefore refer to our previous discussion of Rousseau and Deering. Importantly, the above discussion addresses how combining Deering's teaching with Rousseau's system suggests a correspondence between a rendering unit and a convolution unit and, therefore, teaches the step of receiving video pixel data from a video output of a dedicated rendering unit. Moreover, one cannot show nonobviousness by attacking Deering or Rousseau individually (*see* Br. 8-9) where the rejections are based on combinations of references. *See In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Thus, the combined system of Rousseau/Deering not only suggests a system that inherently possesses the ability to receive video pixel data from a video output of a dedicated rendering unit, but also teaches a combined system that actually performs the step of receiving video pixel data from a video output of a dedicated rendering unit.

For the foregoing reasons, Appellants have not shown error in the obviousness rejection of claims 14, 18, 19, and 21-25 based on the combination of Rousseau and Deering.

CONCLUSION

Appellants have not shown that the Examiner erred in rejecting claims 1-14, 18, 19, and 21-25 under § 103.

ORDER

The Examiner's decision rejecting claims 1-14, 18, 19, and 21-25 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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